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EG&G - ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT

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**ROCKY FLATS PLANT
EMD OPERATING
PROCEDURES MANUAL**

**Manual No.: 5-21000-OPS-FO
Procedure No.: Table of Contents, Rev 13
Page: 1 of 2
Effective Date: 05/12/92
Organization: Environmental Management**

THIS IS ONE VOLUME OF A SIX VOLUME SET WHICH INCLUDES:

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VOLUME II: GROUNDWATER (GW)
VOLUME III: GEOTECHNICAL (GT)
VOLUME IV: SURFACE WATER (SW)
VOLUME V: ECOLOGY (EE)
VOLUME VI: AIR (AP)**

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FO.10	Receiving, Labeling, and Handling Environmental Materials Containers	2	05/12/92

ADMIN RECORD

A-SW-001023

REVIEWED FOR CLASSIFICATION/UCN

By

Date

[Signature]
12/18/1992
[Signature] 12/92 *[Signature]*

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FO.13	Containerization, Preserving, Handling and Shipping of Soil and Water Samples	2	05/12/92
FO.14	Field Data Management	2	05/12/92
FO.15	Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs)	2	05/12/92
FO.16	Field Radiological Measurements	2	05/12/92
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HANDLING OF DRILLING FLUIDS AND CUTTINGS

EG&G ROCKY FLATS PLANT
EMD MANUAL OPERATION SOP

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FO&S, Rev. 2
1 of 12
March 1, 1992
Environmental Management

Category 2

TITLE:
HANDLING OF DRILLING FLUIDS
AND CUTTINGS

Approved By:

[Signature]
(Name of Approver)

MAY 12 1992

(Date)

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2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) will be used at the Rocky Flats Plant (RFP) to describe the proper methods to control, contain, and handle drilling fluids and cuttings.

This SOP describes the handling of drill cuttings and drilling fluids and the use of organic vapor detectors (OVDs) and radiological screening for field monitoring.

3.0 RESPONSIBILITIES AND QUALIFICATIONS

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training and/or licenses.

The subcontractor's site manager is responsible for the proper handling of all materials generated during drilling activities.

The subcontractor is responsible for drumming drill cuttings. Drums containing drill cuttings will be transferred to the custody of EG&G Waste Operations only after the drums' contents have been characterized and the drums have passed inspection. Characterization will be based on analytical results of the samples corresponding to the cuttings associated with the drums' contents and the EG&G Hazardous Waste Requirements Manual (HWRM).

The subcontractor is also responsible for moving environmental liquids associated with EM drilling activities to holding tanks located at the main EG&G decontamination facility.

It is the subcontractor's site manager's responsibility to report as soon as possible to the EG&G project manager or a designated EG&G representative any damage incurred to a drum. Types of

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damage include holes, damage to the lid seal, or any other problem that may compromise drum integrity. Damaged drums will have their contents transferred to an undamaged drum.

The subcontractor's site manager will assign personnel to conduct weekly inspections of all the drums issued to the subcontractor until the drums are relinquished to the custody of EG&G Waste Operations. These inspections will ensure that drum integrity and drum labeling is maintained.

Radiological Engineering-approved subcontractor Health and Safety Specialists are responsible for conducting radiation screenings of equipment, samples, and personnel before they leave potentially contaminated work areas.

EG&G's Waste Operations personnel are responsible for the collection, transport, and storage, of solid environmental materials from the drum transfer area and environmental liquids from the decontamination facility.

4.0 REFERENCES

4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

EG&G. Hazardous Waste Requirements Manual (HWRM). June 1991.

EG&G. On-Site Transportation Manual. 1991.

EG&G. Policies: Rocky Flats Plant, Use and Color Coding of Drums. RFPM MAT 20-005. November 3, 1989.

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Environmental Protection Agency (EPA). A Compendium of Superfund Field Operations Methods. EPA/540/P-87/001. December 1987.

Hall, Ridgway M. Jr., Tom Watson, Jeffrey J. Davidson, David R. Case, Nancy S. Bryson. RCRA Hazardous Wastes Handbook. 6th Edition. Government Institutes, Inc. Rockville, MD. March 1986.

National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), U.S. Coast Guard (USCG), and U.S. Environmental Protection Agency (EPA). Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. October 1985.

4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in this SOP are as follows:

- SOP FO.3, General Equipment Decontamination
- SOP FO.4, Heavy Equipment Decontamination
- SOP FO.5, Handling of Purge and Development Water
- SOP FO.6, Handling of Personal Protective Equipment
- SOP FO.7, Handling of Decontamination Water and Wash Water
- SOP FO.9, Handling of Residual Core and Laboratory Samples
- SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO.12, Decontamination Facility Operations
- SOP FO.15, Use of Photoionizing Detectors and Flame Ionizing Detectors
- SOP FO.16, Field Radiological Measurements
- SOP GT.2, Drilling and Sampling Using Hollow-Stem Auger Techniques

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5.0 EQUIPMENT

The following items will be required during most field operations that generate drilling fluids and cuttings:

- Gray, 55-gallon drums, Type 17C
- Gray, 30-gallon drums, Type 17C
- Rigid liner for drums
- Shovels and scoops with nonporous surfaces to facilitate decontamination
- Paint stick for marking drums
- Organic vapor detector (OVD)
- Field radiation monitor
- Drum bung wrench
- Tools for opening and sealing open-top 55-gallon or 30-gallon drums with a clamp-type sealing band
- Pallets
- Opaque weather-proof sheeting
- Hand pressurized sprayer
- Desiccant
- If drilling muds are used, a seamless container (such as a molded plastic type) will be used for decanting fluids from residual sediments
- Personal Protective Equipment (PPE) as specified in the Site-Specific Health and Safety Plan
- A heavy equipment forklift or truck equipped with a drum grapppler and capable of lifting a 55-gallon or 30-gallon drum containing solid or liquid materials

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6.0 CONTAMINANT CHARACTERIZATION

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil and groundwater analyses and the results of field radiological surveys conducted by Radiological Engineering-approved contractor Health and Safety Specialists. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Protected Areas (PA)

A listing and locator map of all known Individual Hazardous Substance Sites (IHSS) has been included in Appendix FO.10A of SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers.

Drill cuttings generated during EM field operations will be handled by containerizing them in 55-gallon or 30-gallon gray drums as they are generated. Environmental liquids generated during EM field operations will be containerized in 55-gallon, gray, closed top drums or appropriately sized containers. The liquid containers will be moved to the environmental liquids area at the main decontamination facility.

The use of field monitors for the detection of volatile organics and radionuclides is discussed in SOP FO.15, Use of Photoionizing Detectors and Flame Ionizing Detectors; and SOP FO.16, Field Radiological Measurements and their use is defined in the Health and Safety Plan (HSP).

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The types of contamination that may be encountered within potentially contaminated work areas include the following:

- Low-level radioactively contaminated substances
- Nonradioactive RCRA-regulated hazardous (hazardous) substances
- Mixed (low-level radioactive and hazardous substances)

6.1 PREDRILLING PROCEDURES

Predrilling procedures will be conducted prior to drilling a well or boring regardless of the work area characterization. Drilling procedures include the following:

- Subcontracting personnel will conduct a radiological screening (see SOP FO.16, Field Radiological Measurements) of the ground surface prior to any drilling activity.
- The surface soil around the staked boring or well location will be wetted with distilled water from a hand-pressurized spray bottle. The wetting will be sufficient to preclude dust generation during the soil removal process.
- The subcontractor personnel will use a shovel to remove a depth of approximately 8-inches of soil from an arc of sufficient size to allow for approximately 2 inches of clearance on each side of the auger. The wet soil will be spread over the ground near the drilling site. Drilling activities may now begin. The shovel will be decontaminated between work areas.

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6.2 DRILLING PROCEDURES

The auger will be positioned approximately in the center of the 20-cm-deep excavation to begin drilling. If significant dust is generated during drilling operations, cuttings will be wetted with distilled water from a hand-pressurized sprayer and placed on the ground. Cuttings that are moist need not be sprayed.

An OVD and a field radiation monitor will be used to screen core or cuttings to determine if hazardous or radioactive substances are present so that the proper PPE is selected in order to comply with the HSP. In work areas requiring a radiological work permit and an Integrated Work Control Permit with an appropriate work package, a Radiological Engineering-approved subcontractor Health and Safety Specialist will be contacted to radiologically monitor the equipment and PPE at the end of each day's drilling activities. The equipment and PPE will be handled per SOP FO.4, Heavy Equipment Decontamination and SOP FO.6, Handling of Personal Protective Equipment.

6.3 FIELD MONITORING

OVD and field radiological screenings will be conducted by the subcontractor within each work area for all intrusive activities to ensure safety and to determine the proper PPE to be worn by all workers. The OVD and field radiological monitors will be used as described in SOP FO.15, Use of Photoionizing Detectors and Flame Ionizing Detectors, and FO.16, Field Radiological Measurements. For the purposes of this SOP, the following procedures apply:

- Prior to the start of work, measure the organic vapor and radioactive background level on the upwind side of the activity area. Record the results on Form FO.8A, Field Monitoring Results of Cuttings or Core. (This form will be used to record all readings taken on cutting or core.)

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- Monitor the borehole for organic vapors and radiological contaminants where the intrusive work is occurring. The results of monitoring shall be recorded on Form FO.8A. When hollow-stem augers are being used, monitor inside the auger each time the drive head is removed. When solid-stem augers are being used, monitor the cuttings at ground level each time the auger is stopped.
- If the cuttings or core are wet, smears will be taken to monitor the presence of radioactive materials. Document that a smear was taken and the smear number on Form FO.8A. Smear results will be documented on Form 1.1B in the Environmental Management Radiological Guidelines (EMRGs), Manual No. 3-21000-OPS-EMRG.
- Single OVD or field radiological measurements greater than the background measurement may indicate the presence of hazardous or radioactive substances and must be verified as described in Subsection 6.3.1.
- When an OVD or field radiological measurement above background is detected, all intrusive work will stop until the verification procedures are complete.

6.3.1 Verified Positive Readings

The following verification procedures will be used after detecting an initial OVD or radiological measurement greater than the background measurement. The verification process will be recorded on Form FO.8B, Verification of Organic Vapor Monitoring Results, and Form FO.16A, Results of Radiological Monitoring in the Field.

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- For an OVD reading above background, turn off any diesel- or gasoline-driven engines operating within the vicinity of the work area since most OVDs will detect incomplete combustion by-products.
- Remove the instrument (OVD or field radiological) from the work area and make an upwind measurement of ambient organic vapor levels or radioactivity, as appropriate.
- That measurement will be followed by a remeasurement at the same location where the positive measurement was recorded.
- If the remeasurement is not above background, repeat the preceding actions for a third measurement and record the results.
- If any two of the three measurements (including the original measurement) indicate organic vapor levels or radioactivity greater than the background level, the original measurement has been verified. Record the final results on Form FO.8A as well as the verification forms.

6.4 INVESTIGATIVE MATERIALS

6.4.1 Handling Drill Cuttings

Drill cuttings will be contained in gray drums with a liner (See SOP FO.10 Receiving, Labeling, and Handling Environmental Materials Containers, Section 6.3.2) regardless of the work area characterization. Prior to the filling of the drum, two liters of desiccant will be placed in the bottom of the drum and two additional liters will be put into the drum when the drum has been filled half full. Cuttings will be placed in the drum up to approximately two inches from the top.

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After filling, these gray drums will be sealed, marked, and placed on a leveled pallet at the drilling site. Once the laboratory analytical results of the environmental samples have been received they will be assessed by EG&G. If the drum's contents are determined to be uncontaminated or pose no risk, the contents will be disposed of in the landfill. If the drum's contents are determined to contain hazardous substances, mixed substances, or radioactive substances, the drums will be painted the appropriate color corresponding to the characterization of the drum's contents, labeled appropriately (See SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers), and stored by EG&G Waste Operations according to the proper SOPs contained in the HWRM and the On-Site Transportation Manual.

Drilling cuttings generated from drilling shot holes for geophysical probes will be placed back in the original excavation and not contained in drums.

6.4.2 Handling Drilling Fluids

If drilling fluids are to be used, the entire pumping system will be checked for leaks before the pumping system is taken to the work area. Checking will consist of assembling the system and pumping potable quality water through it. If a leakage in the hose connections or elsewhere is detected, it will be repaired before being used.

If a drilling fluid system being used at a drill site develops a significant leak that will result in the potential contamination of the surficial soils, the system will be shut down and repaired within the work area, if feasible. If repairs are not feasible within the work area, the drill rig will be removed from the work area and decontaminated before it is repaired (see SOP FO.4, Heavy Equipment Decontamination).

Drilling fluids will be contained in 55-gallon or 30-gallon, gray, closed top drums or appropriately sized containers. Field personnel should decant the environmental liquids from one drum (or

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container) to another (or from a trough to a drum or container) prior to moving if the amount of sediment within the environmental liquids is substantial. The residual sediments will be placed in gray drums according to Section 6.4.1 of this SOP. The environmental liquid containers will be moved to the environmental liquids area at the main decontamination facility. (See SOP FO.12, Decontamination Facility Operations for details pertaining to the environmental liquids area.) Environmental liquid containers will be marked and moved as described in SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers. The liquid containers will be emptied by the subcontractor into the decanting tanks at the decontamination facility.

7.0 DOCUMENTATION

A permanent record of the implementation of this SOP will be kept by documenting field observations and data. Form FO.8A, Field Monitoring Results of Cutting or Core is provided to assist in the documentation of the field monitoring. As described in Subsection 6.3, Form FO.8A and/or FO.16A will be used, in addition to the Form FO.8B to validate any initial OVD or RAD measurement greater than background. Results of the field radiological monitoring will be documented in accordance with SOP FO.16, Field Radiological Measurements. Form FO.14C, Record of Drilling Fluids and Cuttings will be used (one form per borehole/well location) to document the source of drilling cuttings and corresponding OVD and RAD results.

Additionally, drums issued to a subcontractor by EG&G will have an associated Drum Field Log Form (FO.10A) and a Contaminant Characterization Form (FO.10C) as discussed in SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers.

1. Project Location: _____ Site Number: _____ Date: _____

Not Potentially Contaminated_____ RAD_____ Hazardous_____ Mixed_____

Manufacturer and Model No.	Serial Number	Probe Type	Probe Serial No.	Calibration Due Date	Background Reading	Units (cpm)

[illegible]

* If any OVD or RAD measurements are above background measurements, forms FO.8B and/or FO.16A must be completed for verification

Completed By: _____

Print Name	Signature
------------	-----------

Subcontractor: _____

1. Project Location: _____ Site Number: _____ Date: _____

[illegible]

Completed By: _____

Print Name _____

Signature

Subcontractor: _____

VERIFICATION OF ORGANIC VAPOR MONITORING RESULTS

1. Project Name & Number: _____

Date: _____ Site Number: _____

2. Historical Characterization (check one):

☐ Not potentially contaminated ☐ Low-Level RAD ☐ Hazardous ☐ Mixed

3. Pework/Background Organic Vapor Monitoring Results

Instrument Used: _____ Serial No. _____

(Numeric Value): _____ (Units, i.e., ppm): _____

4. Verification Measurements

Time	Depth (Ft)	Initial Reading (ppm)	First Background Check (ppm)	First Verification Reading (ppm)	Second Background Check (ppm)	Second Verification Reading (ppm)

5. If either of the verification measurements are above the preceding background measurement, the initial measurement has been verified.

Completed By: _____

Print Name

Signature

Date

Subcontractor: _____

1. Project Name & Number: _____

Contaminant classes assumed to be present (check one)

3. Unanticipated contaminant classes found

4. Drum and Environmental Monitoring Information

Radioisotopes: _____ (Instrument Used)

[illegible]

Subcontractor: _____